June 28, 1960 R. M. POPE 2,942,701

COMBINATION FLOORING

Filed March 19, 1956

FIG.1.

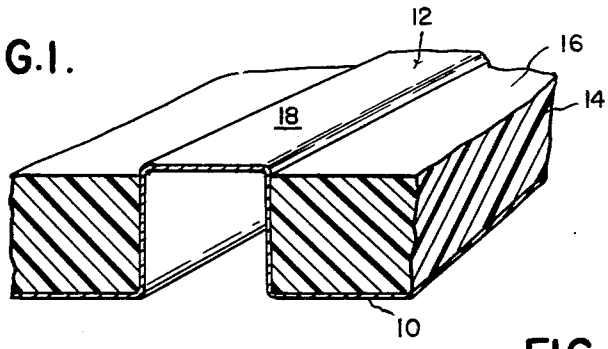


FIG.8.

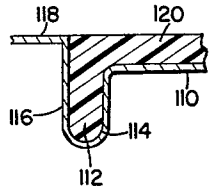


FIG.2.

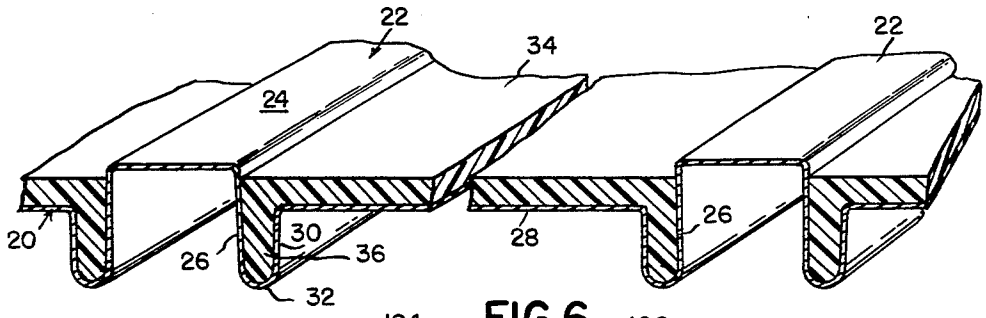
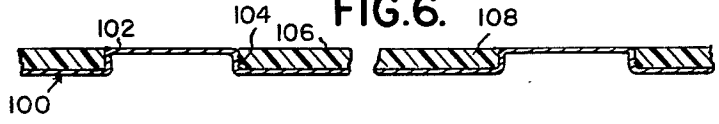


FIG.6.



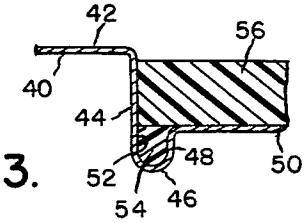


FIG.3.

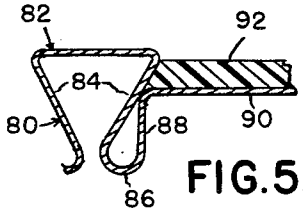
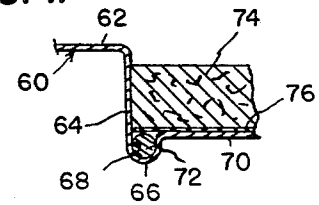


FIG.5.

FIG.4.



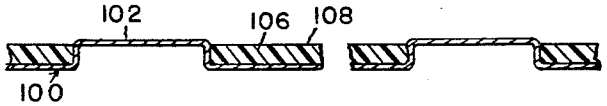


FIG.7.

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COMBINATION FLOORING

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7 Claims. (Cl. 189—34)

The present invention relates to combination flooring and more particularly, to a metal and composition flooring particularly useful in trucks.

Flooring of this type while capable of general application, finds one of its particularly useful fields as flooring for trucks. The floor is strongly reinforced, tends to eliminate slipping, and is also somewhat resilient and thus resists damage from impacts.

It is an object of the present invention to provide combination flooring comprising a corrugated metal sheet shaped to provide a plurality of laterally spaced parallel upwardly convex hollow ribs spaced apart to define channels, and a suitable composition, preferably plastic or fibrous in nature, substantially filling the channels but leaving the top portions of the ribs exposed thereabove. The top surface of the composition may be flush with the tops of the ribs, but preferably lies slightly below. The ribs may be spaced apart a distance approximately equal to their height, but preferably their lateral spacing is several times their height.

It is a further object of the present invention to provide a combination metal and composition metal flooring characterized by the economy with which it may be produced, its relatively great strength as compared to the materials employed, its property of minimizing slippage thereon, its resilience, and by its sound deadening properties.

Other objects and features of the invention will become apparent as the description proceeds, especially when taken in conjunction with the accompanying drawing, wherein:

Figure 1 is a fragmentary perspective view partly in section of combination flooring of the type referred to herein.

Figure 2 is a perspective view partly in section, showing a modification of the combination flooring.

Figures 3–8 are fragmentary sectional views showing additional modifications of the combination flooring.

Referring now to Figure 1, the flooring comprises a metal sheet **10** having a plurality of laterally spaced parallel upwardly convex hollow ribs indicated generally at **12**, these ribs being spaced apart to define channels therebetween. In a typical embodiment of the invention the ribs **12** may be roughly square in cross-section as shown having a height and width of approximately one inch. The space between adjacent side walls of adjacent ribs may vary substantially. In some cases this dimension, which is the width of the channels between the ribs, may be approximately the same as the height of the ribs, and in the present instance one inch. On the other hand, it is ordinarily desirable to space the ribs apart a distance substantially greater, and preferably several times greater, than the height thereof. Thus for example, the lateral spacing between the ribs **18** in the illustrated embodiment of the invention may be about six inches.

To complete the combination flooring the channels have received therein a suitable filler material or composition **14**. This filler material is non-metallic and is preferably plastic. A suitable material for this purpose may be essentially plastic in nature including fibrous or granular material therein which may be selected to render the composition essentially anti-skid in nature. Excellent results are obtained when the composition employed in the channels between the ribs is resin including wood fiber. Thus for example, granulated particles such as sand, crushed limestone, wood shavings, asbestos, light weight aggregates (cinders), or essentially fibrous material may be included therein.

The filler material or composition **14** in this figure is illustrated as provided to a depth such that its top surface **16** lies slightly below the upper surface **18** of the ribs **12**. As will subsequently appear, it is also within the scope of the present invention to provide the composition or filler material so that its upper surface is flush with the top surfaces of the ribs. In the embodiment of the invention illustrated in Figure 1 however, the upper surface **16** of the composition or filler material is disposed a small distance as for example ⅛ to 1/16 of an inch below the upper surface of the ribs.

The floor produced by the above described construction is a one-piece floor as contrasted with flooring built up of a plurality of smaller parts, thus simplifying assembly of the construction which includes the floor.

By providing the construction thus described, a tread surface is formed having a plurality of spaced rib portions separated by relatively wide tread surfaces of essentially non-skid composition material. Thus, the surface is particularly effective to prevent slipping thereon.

Where the upper surface of the ribs **12** is located slightly above the upper surface **16** of the composition or filler material, the upper surface of the ribs may constitute support elements on which loads may slide relatively freely longitudinally of the ribs. On the other hand, the relative non-skid characteristic of the upper surface of the filler material prevents undesired skidding or slipping thereon.

Another important advantage of the present construction is the resilient nature of the flooring. This renders it capable of withstanding impact loads without danger of fracture or permanent bending.

In addition to this useful feature, the combination flooring has the additional advantage of rigidity imparted thereto by the upstanding ribs. The rigidity is further enhanced by the coaction between the ribs and the composition or filler material substantially filling the channels and acting to support the vertical reinforcing walls of the ribs. Additionally, the presence of the composition material in the channels in the relationship shown operates to minimize sound due to vibration or other causes. The embodiment of the invention described above is extremely simple and requires a minimum of forming of the sheet metal component.

While the construction illustrated in Figure 1 is satisfactory for the intended purpose, the construction illustrated in Figure 2 retains most of the advantages thereof and in addition results in further reinforcement of the flooring and in an economy of the composition material used. In this figure the flooring comprises the metal sheet **20** having laterally spaced parallel upwardly convex hollow ribs **22**. The top walls or surfaces **24** of the ribs **22** are preferably flat as illustrated, and the side walls **26** thereof extend vertically. Intermediate the ribs **22** are provided composition receiving channels which are illustrated as having a width at least several times greater than the depth thereof but which may be substantially narrower. In the embodiment of the invention illustrated in Figure 2 the portion of the metal sheet **20** intermediate the side walls **26** of the ribs **22** is formed upwardly to provide flat horizontal strip portions **28** spaced intermediate the tops and bottoms of

the side walls 26. This results in the formation of wall portions 30 extending downwardly from the side edges of the strip portions 28 and which are connected at their bottoms by arcuate return bends 32 to the upwardly extending wall portions 26 leading to the top surfaces 24 of the ribs 22. By this arrangement the amount of composition material indicated at 34, required to fill the channels to a point slightly below the top of the ribs 22 is of course substantially less than in the embodiment illustrated in Figure 1. At the same time additional reinforcement of the combination flooring as a whole is provided by the vertically extending wall portions 30 in addition to the vertically extending wall portions 26. Finally, this reinforcement is enhanced by the presence of the filler material 34 in the grooves or narrow channels 36 provided at the sides of the main channel.

Referring now to Figure 3 there is illustrated a modification of the structure shown in Figure 1. In this case the metal sheet 40 is formed to provide the laterally spaced parallel upwardly convex hollow ribs 42 and the side walls 44 thereof are return bent as indicated at 46 to extend upwardly as at 48 to the intermediate floor or strip portions 50 of the channels between adjacent ribs 42. In this case the return bent portions 48 provide relatively narrow grooves 52 at the sides of the ribs 42. In order to insure that these relatively narrow grooves are completely filled with the composition material, a separately introduced composition material 54 is provided which fills the grooves 52 before the composition material 56 is applied to fill the channels to a short distance below the tops thereof.

Referring now to Figure 4 the metal sheet 60 is illustrated as shaped to provide the laterally spaced parallel upwardly convex hollow ribs 62, the side walls 64 of which are return bent at the bottom as indicated at 66 to form narrow grooves 68. The channels defined between adjacent ribs 62 thus have the bottom wall portions in the form of flat horizontal strips 70. In this case the groove 68 is illustrated as substantially filled with a suitable cohesive composition or filler material 72 which is separately introduced before adding the filler material or composition to the channels. In this case the filler material 72 may be in the form of a cord, preferably impregnated with a suitable plastic material such for example as asphaltic material. This cord may be manually pressed into the relatively narrow groove. Thereafter, filler material 74 may be added as suggested in the foregoing. In Figure 4 however, the filler material 74 is illustrated as in the form of a fibrous material such for example as a hardboard or chipboard. In this case the board 74 is preferably adhered to the upper surface of the bottom wall portion 70 of the channel, suitable adhesive material being indicated at 76.

Referring now to Figure 5 there is illustrated another embodiment of the invention in which the metal sheet 80 is formed to provide a plurality of laterally spaced parallel upwardly convex hollow ribs 82. In this form of the invention however, the side walls 84 of the hollow ribs are inclined as shown and at their bottom edges are provided with return bends 86 connecting to upwardly extending vertical wall portions 88 which in turn connect with the horizontal strip portions 90 defining with the upper portions of the walls 84 a shallow channel intermediate adjacent ribs 82. In this case the junction between the wall portions 88 and 90 may contact the wall portions 84 of the ribs and if desired, may be attached thereto as by welding. This arrangement provides a particularly strong reinforcement for the flooring and provides also for a relatively shallow ply of composition material 92.

Referring now to Figure 6 there is illustrated another embodiment of the present invention. In this case the sheet metal component of the floor is illustrated at 100 and is provided with a plurality of laterally spaced parallel upwardly convex hollow ribs 102, the upper surfaces of which are flat. The space between adjacent ribs 102 constitutes a shallow channel 104 in which is received composition or filler material 106 which may be of the types described in the foregoing. This combination floor differs from that previously described in that the ribs 102 are of relatively small height, thus producing channels 104 which are relatively shallow. For example, the total depth of the channels may be about ¼ of an inch. As illustrated in this figure, the upper surface 108 of the filler material is flush with the upper surface of the ribs 102, the latter being flat. Accordingly, the floor presents a smooth tread surface in which the top surfaces of the ribs are disposed at laterally spaced intervals.

The lateral spacing between the ribs, or the width of the channels may be varied widely in accordance with requirements, but in this embodiment of the invention the width of the channels is preferably at least several times greater than the depth thereof. It will be appreciated that the factors controlling selection of the relative width and depth of the channels and the relative width and height of the ribs are the resilience, tread characteristics, and particularly the strength characteristics of the flooring. Thus, where increased strength is required, the arrangement will be such as to provide either more closely spaced or deeper vertical wall portions of the sheet metal component, or both.

Referring now to Figure 7 there is illustrated a modified construction similar to that shown in Figure 6, in which like reference numerals are used where applicable. This embodiment of the invention differs from that shown in Figure 6 principally in that the composition or filler material 106 is provided in a lesser amount so that its upper surface 108 is displaced beneath the upper surface of the ribs 102. Thus for example, in a practical illustration of this embodiment of the invention, the ribs 102 may be approximately ¼ of an inch in height and the composition or filler material may be provided in the channels to a depth of approximately 3/16 of an inch, leaving the upper surface of the composition material approximately 1/16 of an inch below the upper surfaces of the ribs.

Carrying out this thought still further, the ribs may be provided so as to leave shallow channels therebetween to which filler material may be applied in the form of a relatively thin coating applied by brush or spray.

As seen in Figure 8, the metal sheet may be formed to provide flat horizontal strips 110 which may be of substantial width, relatively narrow upwardly open channels 112 adjacent the edges of the strips, the channels having side walls 114 connected to the edges of said strips, and other side walls 116 extending substantially above the side walls 114. The upper edges of the side walls 116 are connected by relatively narrow tread strips 118. Filler material 120 overlies the strips 110 and fills the channels 112, the upper surface of the filler material being substantially flush with the upper surface of the tread strips 118.

It will be understood that in all embodiments of the invention the metal sheet is provided with the laterally spaced parallel upwardly convex hollow ribs and that the metal sheet intermediate these ribs defines channels therebetween. Preferably these channels have a width at least several times greater than the depth thereof. In all cases these channels are provided with composition or filler material. Preferably the composition or filler material substantially but not completely fills the channels and thereby leaves the top portions of the adjacent ribs exposed. In some cases however, it may completely fill the channels and provide a smooth floor surface with the ribs. It will further be appreciated that in any of the illustrated embodiments of the invention, the composition material may be in the form of a plastic material, introduced into the channels in flowable form and caused to set therein. Alternatively, in all illustrated embodiments of the invention, the composition material in the

channels intermediate the ribs may be in the form of fibrous material such for example as hardboard or chipboard retained in the channels by adhesion.

The composition or filler material should have adequate wear resisting qualities and preferably is somewhat resilient so that it assists the metal component of the flooring in absorbing impacts. If the flooring need not be resilient to gasoline or other petroleum products, the composition material may include asphaltic materials. If the flooring is required to resist gasoline and the like, suitable gasoline resistant plastics are readily available. Thermoplastic materials may be employed and applied to the flooring at an elevated temperature and allowed to cool. Thermo-setting plastic materials may be employed and applied in fluid phase and caused to set by the application of heat. Similarly, chemical setting plastic materials may be applied by mixing with the chemicals which induce setting while the plastic material is in liquid phase, applied to the metal component of the flooring, and allowed to set by chemical action.

The drawings and the foregoing specification constitute a description of the improved combination flooring in such full, clear, concise and exact terms as to enable any person skilled in the art to practice the invention, the scope of which is indicated by the appended claims.

What I claim as my invention is:

1. Combination flooring comprising a single metal sheet having laterally spaced parallel downwardly open channel shaped hollow ribs formed therein and defining upwardly open channels therebetween, the bottom walls of said channels having their laterally intermediate portions shaped upwardly to define relatively narrow sub-channels at the sides of said channels and non-metallic filler material filling said channels and sub-channels.

2. Combination flooring comprising a single metal sheet having laterally spaced parallel downwardly open channel shaped hollow ribs formed therein and defining upwardly open channels therebetween, the bottom walls of said channels having their laterally intermediate portions shaped upwardly to define relatively narrow sub-channels at the sides of said channels and non-metallic filler material in said channels having its upper surface spaced slightly below the tops of said ribs.

3. Combination flooring comprising a single metal sheet shaped to form flat horizontal strips of substantial width, relatively narrow channels at the edges of said strips, said relatively narrow channels having downwardly extending side walls adjacent the edges of said strips and upwardly extending side walls spaced laterally from said downwardly extending walls, said upwardly extending walls extending substantially above said strips, relatively narrow tread strips forming the top edges of said upwardly extending walls, and filler material overlying said strips and having its upper surface slightly below said tread strips.

4. Combination flooring comprising a single metal sheet adapted to form flat horizontal strips of substantial width, relatively narrow channels at the edges of said strips, said relatively narrow channels having downwardly extending side walls adjacent the edges of said strips and upwardly extending side walls spaced laterally from said downwardly extending walls, said upwardly extending walls extending substantially above said strips, relatively narrow tread strips forming the top edges of said upwardly extending walls, and filler material overlying said strips and having its upper surface flush with said tread strips.

5. Combination flooring comprising a single metal sheet having laterally spaced parallel downwardly open channel shaped hollow ribs formed therein and defining upwardly open channels therebetween, the portions of the bottom walls of said channels intermediate the edges thereof being formed upwardly to leave relatively narrow deep grooves at the sides of said channels, filler material in said grooves, and a separately introduced filler material substantially but not completely filling said channels.

6. Combination flooring comprising a single metal sheet shaped to form laterally spaced parallel downwardly open channel shaped hollow ribs defining upwardly open channels therebetween having a width at least several times greater than the depth thereof, the bottom walls of the channels being formed upwardly to provide relatively flat horizontal intermediate portions spaced substantially below the top walls of said ribs, and composition material in said channels having its upper surface substantially flush with the tops of said ribs to leave the top portions of said ribs exposed in the tread surface of said flooring.

7. Combination flooring comprising a single metal sheet having laterally spaced parallel downwardly open channel shaped hollow ribs formed therein and defining upwardly open channels therebetween, said ribs having downwardly and inwardly inclined side wall portions, the material of said sheet being return bent at the bottom edges of the side walls of said ribs and extending thence substantially vertically upwardly substantially into contact with said side walls, and horizontal flat portions interconnecting the upper edges of said substantially vertically extending portions to provide bottom channel walls, and composition material in said channels on said bottom channel walls and extending between the upper portions of the side walls of said ribs.

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